--15. (New) Apparatus as in claim 14 wherein said control program brakes said motors to a standstill within one revolution.--

--16. (New) Method as in claim 1 comprising braking all of said drive motors to a standstill simultaneously when a web break occurs.--

--17. (New) Method as in claim 3 wherein said drive motors are braked to a standstill within one revolution when a web break occurs.--

REMARKS

The specification has been amended to correct a translation error at page 4, and to make explicit the simultaneous stopping of the motors. This is implicit in the synchronous control and the cascade linking of the drive motor controllers described at page 8, lines 5-9.

Claims 1 and 7 have been amended to incorporate the limitation of claim 8, which was amended in the last amendment to recite that each cylinder is driven by a respective motor.

Claims 1-3, 7 and 8 stand rejected under 35 U.S.C. §103 as being unpatentable over Paul GB 2,337,484 (referred to by the Examiner as Wolfgang) in view of Richards U.S. 6,032,579. Note that the inventor's full name is "Wolfgang Paul" so the reference will be referred to herein as "Paul". To the extent that the rejection would be applied to claims as presently amended, it is traversed for the reasons following.

Paul discloses a series of printing mechanisms each having four cylinders. There is no suggestion that each cylinder is driven by a respective motor, as now recited in claims 1 and 7.

There is no basis for the examiner's position that Paul teaches the arrangement of claim 8, which recited "each cylinder driven by a respective drive motor".

Richards discloses plate cylinders 4a, 4b driven by respective drive motors 10a, 10b, and blanket cylinders 6a, 6b which are both driven by a single drive motor 28 mechanically independently of the motors 10a and 10b.

Since neither Paul nor Richards suggests the arrangement of cylinders having respective drive motors recited in claims 1 and 7, these claims cannot be seen as obvious over these references.

Further, neither Paul nor Richards suggests braking the motors to standstill by jerking stop. Paul teaches using the standard brake ramp to slow down every other printing mechanism, the braking ramp being determined predominantly according to machine type by the maximum speed and mass inertia moments of the mechanisms to be braked. See page 3, lines 15-17 and 21-23. After a predetermined time delay, the remaining cylinders are braked according to the standard brake ramp. This delay creates high web tensions between successive printing mechanisms, which causes the web to tear into pieces which are not sufficiently large to cause winding problems which can stress and damage the bearings.

The Examiner apparently gives no weight to the recitation of a jerking stop. With respect to claims 2 and 3, he states that it would be obvious to optimize the speed at which the printing cylinders are being stopped when a web break occurs, since one having ordinary skill would recognize that immediate braking would be most efficient. This position ignores the teaching of Paul.

If Paul had conceived of any way to immediately stop the cylinders in the event of a web break, there would not be a winding problem, and thus no reason for braking alternate printing

mechanisms according to the standard brake ramp followed by braking the remaining printing mechanisms according to the standard brake ramp after a time delay. The fact that Paul does teach this, though, indicates that braking within a few revolutions (1, 2, or 5) would not be possible, and therefore not obvious. This may be because Paul does not use the many individual drive motors which can be braked simultaneously for a cumulative braking effect on the moments of inertia of all the cylinders. With a standard drive arrangement using a single motor to drive multiple cylinders in each printing mechanism via gearing, such a rapid braking is not possible. By virtue of teaching a method of braking alternate cylinders using a standard braking ramp, Paul teaches away from rapid braking of all motors. Braking the motors of Paul to a stop within 1, 2, or 5 revolutions would change the principle of operation of the prior art invention being modified, which is impermissible. See MPEP 2143.01.

Richard does not disclose any emergency stop procedure for the event of a web tear. Hammond U.S. 6,262,555, cited against claims 4, 6, 10, and 12, discloses producing braking torque in an induction motor . However, it does not suggest multiple induction motors associated with respective printing cylinders in a web-fed rotary printing machine. Marozzi U.S. 5,241,258, cited against claim 9, discloses a hollow printing cylinder. However, it does not suggest using hollow cylinders driven by respective motors for the purpose of achieving rapid braking of cylinders in the event of a web break in a printing machine.

Only applicants have realized a combination of features including use of hollow cylinders driven by respective induction motors which permits rapid braking of the cylinders to prevent wind-up in the event of a web break. The only prior art which recognizes this problem is Paul, but the solution is achieved in a very different way, which does not include any suggestion of the rapid braking used by applicants nor the means for achieving it.

The claims as amended being definite and patentable over the art of record, withdrawal of the rejections and early allowance are solicited. If any objections remain, a call to the undersigned is requested.

It is believed that no fees or charges are required at this time in connection with the present application; however, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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AMENDMENTS TO THE SPECIFICATION AND CLAIMS SHOWING CHANGES

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 4, line 9, with the following rewritten paragraph:

In a further development of the invention, the effective direction of the motor torque can be reversed for the purpose of braking, i.e. the motors are simply changed over to reverse as a result of braking. This does not mean a reversal of the direction of rotation but merely the action of the motor torque as a braking torque counter to the direction of rotation of the motor down to a standstill. In this case, for the purpose of braking, the motors are subjected to the torque acting in [the original direction of rotation counter to the] a predefined reverse direction counter to the original direction of rotation.

Please replace the paragraph beginning at page 8, line 17, with the following written paragraph:

In the event of a web break, the control device 10 receives a signal as indicated by an input arrow 13. This signal may come from a web break switch, as it is known, which may be constructed as a light barrier, for example. However, it would also be conceivable to monitor the current torque of the motors 7 and, in the event of a torque change characteristic of a web break, to generate the signal 13 and/or to activate the aforementioned control program containing the emergency stop ramp 12. As a result of activating the control program containing the emergency stop ramp 12, the motors 7 are driven in such a way that they are simultaneously braked to a standstill along the emergency stop ramp 12 within [at least] a few revolutions, that is to say abruptly.

IN THE CLAIMS:

Claims 1 and 7 are amended as follows:

1. (Amended) Method of preventing machine damage in the event of a web break in a web-fed rotary printing machine comprising a plurality of cylinders which, in a print-on position, roll one on another, said printing machine further comprising a plurality of drive motors for driving said cylinders, wherein each said cylinder is driven by a respective said drive motor, said method comprising

synchronizing the motors so that they are all driven at the same speed,

detecting when a web break occurs, and

braking said drive motors to a standstill by jerking stop when a web break occurs.

7. (Amended) Apparatus for preventing machine damage in the event of a web break in a web-fed rotary printing machine having a plurality of cylinders which, in a print-on position, roll one on another, said printing machine further comprising a plurality of drive motors for driving said cylinders, wherein each said cylinder is driven by a respective said drive motor, said apparatus comprising

a control device for synchronizing the motors so that they are all driven at the same speed, said control device having stored therein a control program which can be activated in the event of a web break, said control program having therein an emergency stop ramp which brakes said motors to a standstill by jerking stop, said program driving said motors along said stop ramp in the event of a web break.